

PRIOR ART
FIG. 1

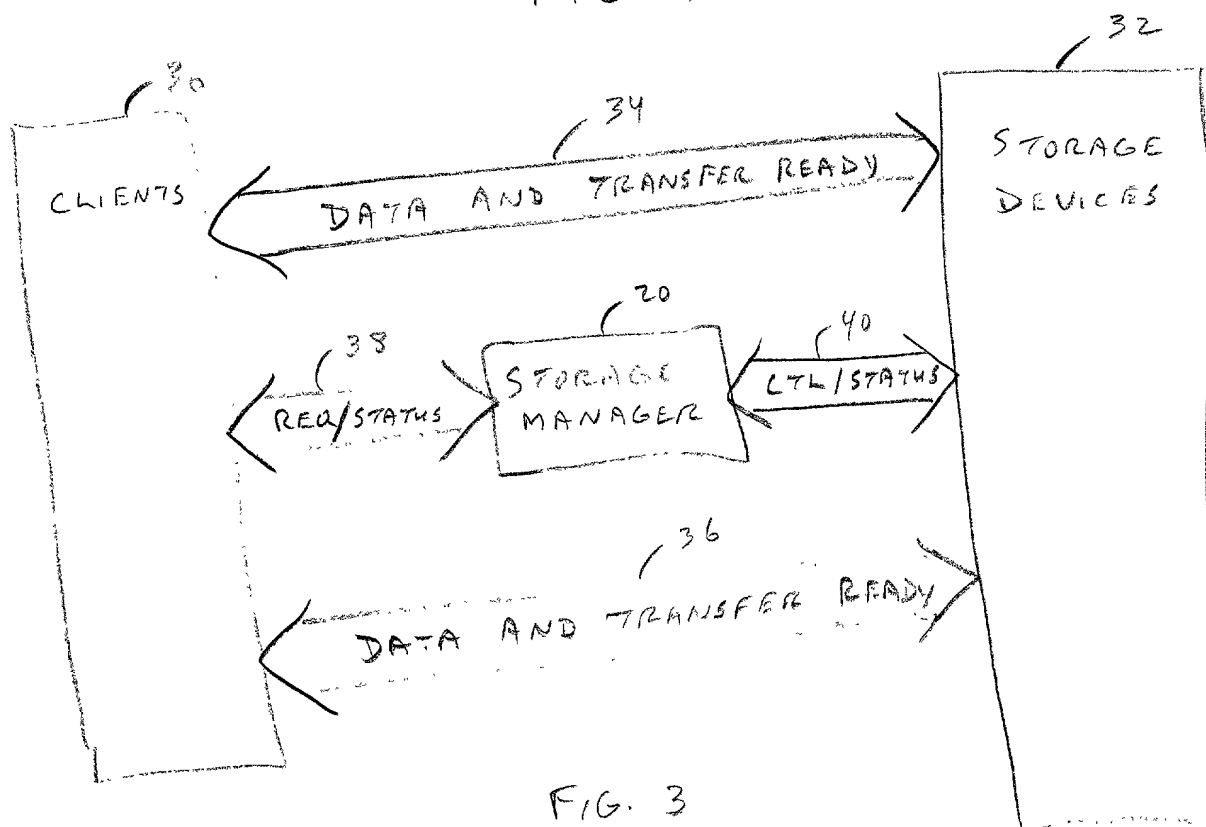


FIG. 3

FIG. 3

SWITCH ALIASED READ TRANSACTION PROCESS FOR REDIRECTING DATA AND TRANSFER READY FRAMES

FIG. 2A

SWITCH	STORAGE DEVICE	STORAGE MANAGER	CLIENT DEVICE
		(1) STORAGE MANAGER IS CONFIGURED TO KNOW SWITCH PORTS IN CLIENT AND STORAGE PATHS (EXCEPT IN EMBODIMENTS WHERE EVERY PORT OF THE SWITCH STORES EVERY REDIRECTION COMMAND)	
			(2) READ COMMAND SENT FROM CLIENT (HOST) TO STORAGE MANAGER FOR SCSI BLOCKS 7-11. ORIGINATOR EXCHANGE ID IS ESTABLISHED BY HOST
		(3) STORAGE MANAGER MAPS ORIGINAL REQUEST TO STORAGE DEVICE NUMBER AND BLOCKS ON THAT DEVICE AND DETERMINES FROM WHICH CLIENT THE REQUEST CAME	
		(4) MANAGER SENDS AT LEAST A SECOND REDIRECTION COMMAND (FOR RESPONDER FRAMES ONLY) TO THE SWITCH CENTRALIZED REDIRECTION PROCESS OR, AT LEAST TO THE REDIRECTION PROCESSES IN THE PORTS THAT WILL BE REQUIRED TO MAKE A CONNECTION BETWEEN THE STORAGE DEVICE DETERMINED IN STEP (3) AND THE CLIENT THAT SENT THE REQUEST. THE APPROPRIATE REDIRECTION PROCESS(ES) THEN STORE THE REDIRECTION COMMANDS IN CENTRALIZED LOOKUP TABLE OR IN AT LEAST THE LOOKUP TABLES OF THE INVOLVED PORTS. THE SECOND REDIRECTION COMMAND HAS "OLD ADDRESS DATA" THAT IS USED TO RECOGNIZE FRAMES TO BE REDIRECTED, AND HAS "NEW ADDRESS DATA" THAT IS USED TO RELABEL THE FRAMES	

SWITCH ALIASED READ TRANSACTION PROCESS FOR REDIRECTING DATA AND TRANSFER READY FRAMES

FIG. 2B

		TO BE REDIRECTED.	
		(5) MANAGER SENDS READ COMMAND TO STORAGE DEVICE DETERMINED IN STEP (3). USE ANY ORIGINATOR EXCHANGE ID ASSIGNED BY THE MANAGER	
	(6) STORAGE DEVICE SENDS REQUESTED DATA BACK IN FRAMES ADDRESSED TO STORAGE MANAGER USING THE ORIGINATOR EXCHANGE ID ASSIGNED BY STORAGE MANAGER AND ASSIGNS ANY RESPONDER ID		
(7) SWITCH PORT RECOGNIZES THE FRAMES ADDRESSED TO STORAGE MANAGER BY THE ORIGINATOR EXCHANGE ID, SOURCE AND DESTINATION ADDRESS AND, IF THE FRAMES ARE RESPONDER FRAMES AND ARE DATA OR TRANSFER READY FRAMES, THE REDIRECTION PROCESS IN THE SWITCH RELABELS THEM WITH THE "NEW ADDRESS DATA" TO REDIRECT THE RELABELLED FRAMES DIRECTLY TO THE CLIENT DEVICE WHICH REQUESTED THE DATA AND TO MAKE THEM LOOK AS IF THEY CAME FROM THE STORAGE MANAGER			

FIG. 2B

SWITCH ALIASED READ TRANSACTION PROCESS FOR REDIRECTING
DATA AND TRANSFER READY FRAMES

FIG. 2C

(8) SWITCH DETERMINES FROM NEW DESTINATION ADDRESS WHICH PORT TO FORWARD FRAME TO AND MAKES THE APPROPRIATE CONNECTIONS TO FORWARD THE FRAME TO THE PORT COUPLED TO THE CLIENT DEVICE THAT REQUESTED THE DATA			
			(9) CLIENT DEVICE RECEIVES FRAME OR FRAMES AND GIVES THE DATA TO WHATEVER PROCESS IN THE CLIENT REQUESTED THE DATA.
	(10)) STORAGE DEVICE SENDS GOOD STATUS FRAME TO STORAGE MANAGER		
(11) REDIRECTION PROCESS IN SWITCH PORT OR CENTRALIZED REDIRECTION CIRCUITRY READS HEADER TYPE OF FRAME AND DETERMINES THAT THE STATUS FRAME IS NOT DATA AND DOES NO HEADER MODIFICATION AND ROUTES STATUS FRAME TO STORAGE MANAGER. IN THE PREFERRED EMBODIMENT, THE SWITCH AL SO			

FIG. 2C

SWITCH ALIASED READ TRANSACTION PROCESS FOR REDIRECTING DATA AND TRANSFER READY FRAMES

FIG. 2D

AUTOMATICALLY PURGES ALL REDIRECTION COMMANDS ASSOCIATED WITH THE TRANSACTION TO WHICH THE STATUS FRAME APPLIES			
		(12) STORAGE MANAGER SENDS GOOD STATUS FRAME HEADER TO THE REQUESTING CLIENT. THE STORAGE MANAGER. IN ALTERNATIVE EMBODIMENTS WHERE THE SWITCH DOES NOT AUTOMATICALLY PURGE, THE STORAGE MANAGER ALSO SENDS A PURGE COMMAND TO THE SWITCH IDENTIFYING WHICH REDIRECTION COMMANDS NEED TO BE PURGED FROM THE LOOKUP TABLES	
(13) IN THE ALTERNATIVE EMBODIMENTS, THE SWITCH RECEIVES THE PURGE COMMAND FROM THE STORAGE MANAGER AND PURGES THE IDENTIFIED REDIRECTION COMMANDS FROM THE APPROPRIATE LOOKUP TABLE(S)			

FIG. 2D

FIG. 4A**SWITCH ALIASED WRITE TRANSACTION TO REDIRECT EVERY DATA AND TRANSFER READY FRAME**

SWITCH	STORAGE DEVICE	STORAGE MANAGER	CLIENT DEVICE
		(1) CONFIGURATION DATA OR DISCOVERY PROCESS DETERMINES WHICH DEVICES ARE COUPLED TO WHICH PORTS (OMIT THIS STEP IN BROADCAST OR CENTRALIZED EMBODIMENTS)	
			(2) CLIENT SENDS WRITE COMMAND TO STORAGE MANAGER
		(3) STORAGE MANAGER COMPUTES MAPPING TO DETERMINE WHERE DATA TO BE WRITTEN IS TO BE STORED. THEN TWO REDIRECTION COMMANDS ARE WRITTEN AND SENT TO THE SWITCH FOR STORAGE IN AT LEAST ONE LOOKUP TABLE	
		(4) STORAGE MANAGER SENDS A WRITE COMMAND TO THE STORAGE DEVICE AND ASSIGNS AN ORIGINATOR EXCHANGE ID	
	(5) STORAGE DEVICE SENDS A TRANSFER READY FRAME TOWARD THE STORAGE MANAGER.		
(6) SWITCH RECOGNIZES TRANSFER READY FRAMES AND RECOGNIZES THE FRAME AS A RESPONDER FRAME, AND GENERATES A SEARCH KEY FROM			

FIG. 4B
SWITCH ALIASED WRITE TRANSACTION TO REDIRECT EVERY
DATA AND TRANSFER READY FRAME

THE TRANSFER READY FRAME HEADER DATA, AND FINDS A MATCH BETWEEN THE SEARCH KEY DATA AND OLD ADDRESS DATA OF A SECOND REDIRECTION COMMAND. THE SWITCH THEN COPIES THE RESPONDER EXCHANGE ID FROM THE TRANSFER READY FRAME AND WRITES IT TO THE NEW ADDRESS DATA OF THE ASSOCIATED FIRST REDIRECTION COMMAND. THE RELABELLING PROCESS OF THE SWITCH PORT THEN USES NEW ADDRESS DATA FROM THE MATCHING SECOND REDIRECTION COMMAND TO RELABEL THE FRAME AND FORWARDS THE RELABELLED FRAME TO THE SWITCH ROUTING PROCESS FOR REDIRECTION TO CLIENT THEREBY BYPASSING STORAGE MANAGER			
			(7) CLIENT RECEIVES EACH TRANSFER READY FRAME AND RESPONDS BY TRANSMITTING A FRAME OF WRITE DATA TOWARD THE STORAGE MANAGER
(8) SWITCH RECEIVES DATA FRAME(S) AND RECOGNIZES EACH AS A ORIGINATOR DATA FRAME.			

FIG. 4C**SWITCH ALIASED WRITE TRANSACTION TO REDIRECT EVERY DATA AND TRANSFER READY FRAME**

SWITCH CREATES A SEARCH KEY FROM THE HEADER DATA OF EACH DATA FRAME AND USES SEARCH KEY (TYPICALLY THE DESTINATION ADDRESS AND THE RESPONDER EXCHANGE ID) TO SEARCH OLD ADDRESS DATA OF ACTIVE FIRST REDIRECTION COMMANDS IN LOOK UP TABLE(S) OF SWITCH. IF A MATCH IS FOUND, THE FRAME IS RELABELLED USING THE NEW ADDRESS DATA FROM THE MATCHING FIRST REDIRECTION COMMAND, AND THE RELABELLED FRAME IS PASSED TO THE ROUTING PROCESS			
	(9) STORAGE DEVICE RECEIVES THE DATA FRAME AND STORES IT. IF THE AMOUNT OF DATA TO BE WRITTEN IS MORE THAN ONE FRAME, STORAGE DEVICE REPEATS STEP (5) AS MANY TIMES AS NECESSARY TO GET ALL THE DATA STORED		
(10) SWITCH REPEATS STEPS (5) AND (8) AS MANY TIMES AS NECESSARY TO GET ALL THE DATA STORED			
			(11) CLIENT DEVICE REPEATS STEP (6) AS MANY TIMES AS NECESSARY TO GET

FIG. 4D**SWITCH ALIASED WRITE TRANSACTION TO REDIRECT EVERY DATA AND TRANSFER READY FRAME**

			ALL THE DATA STORED.
	(12) STORAGE DEVICE SENDS DONE STATUS TO THE STORAGE MANAGER WHEN THE LAST DATA FRAME HAS BEEN RECEIVED AND STORED WITH NO ERRORS		
(13) SWITCH DOES NOT REDIRECT THE STATUS FRAME AND FORWARDS IT TO STORAGE MANAGER. IN THE PREFERRED EMBODIMENT, THE SWITCH AUTOMATICALLY PURGES THE FIRST AND SECOND REDIRECTION COMMANDS THAT PERTAIN TO THE TRANSACTION JUST COMPLETED.			
		(14) STORAGE MANAGER RECEIVES DONE STATUS FRAME AND FORWARDS IT TO THE CLIENT DEVICE. IN ALTERNATIVE EMBODIMENTS WHERE THE SWITCH DOES NOT AUTOMATICALLY PURGE, STORAGE MANAGER ALSO SENDS PURGE COMMANDS TO SWITCH TO PURGE THE TWO REDIRECTION COMMANDS THAT WERE ISSUED FOR THE WRITE TRANSACTION JUST COMPLETED	
(16) IN ALTERNATIVE EMBODIMENTS, THE			(15) CLIENT RECEIVES THE

FIG. 4E
SWITCH ALIASED WRITE TRANSACTION TO REDIRECT EVERY DATA AND TRANSFER READY FRAME

SWITCH RECEIVES THE PURGE COMMAND FROM THE STORAGE MANAGER AND FINDS AND PURGES THE APPROPRIATE FIRST AND SECOND REDIRECTION COMMANDS.			STATUS FRAME
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FIG. 5

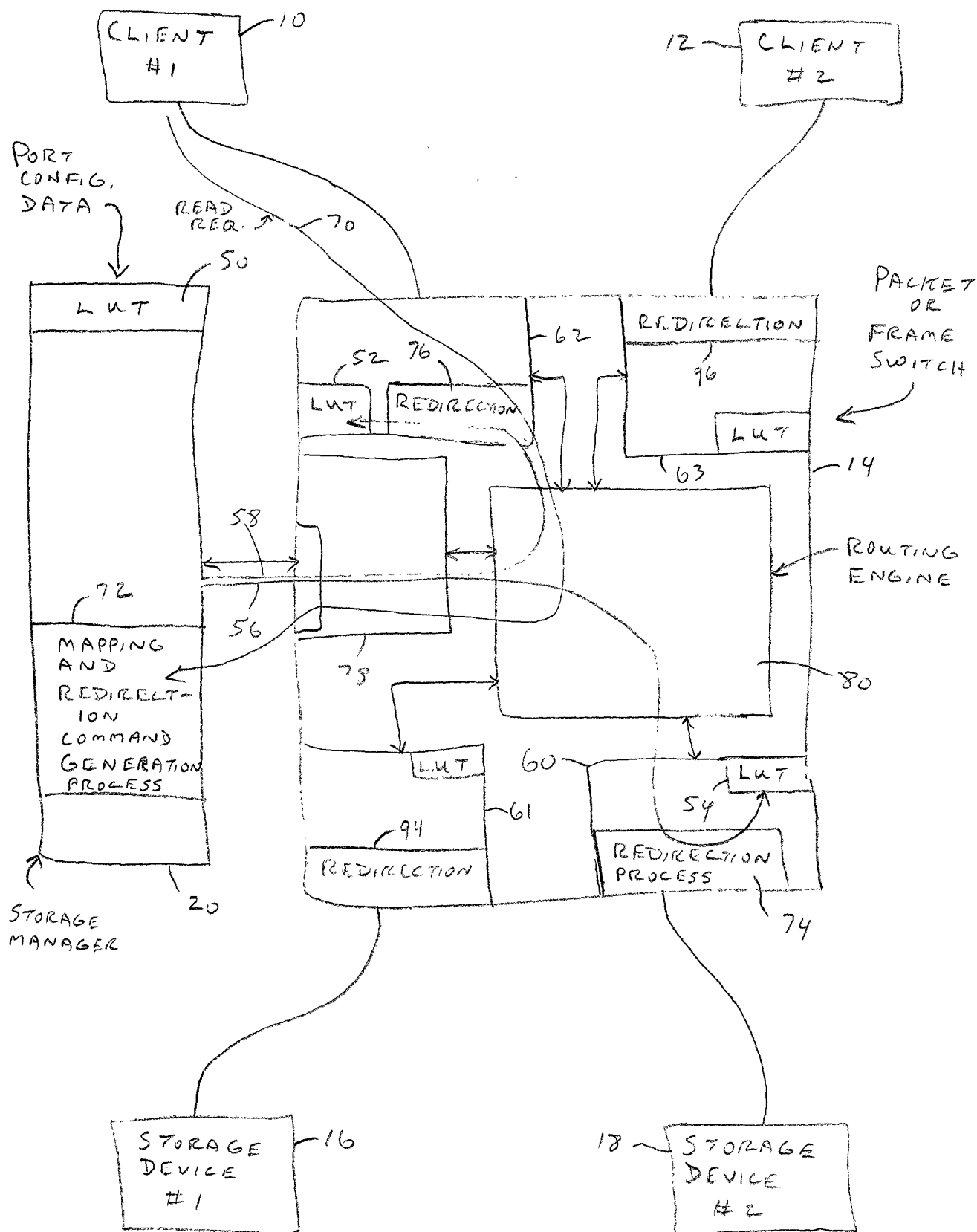


FIG. 5

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2
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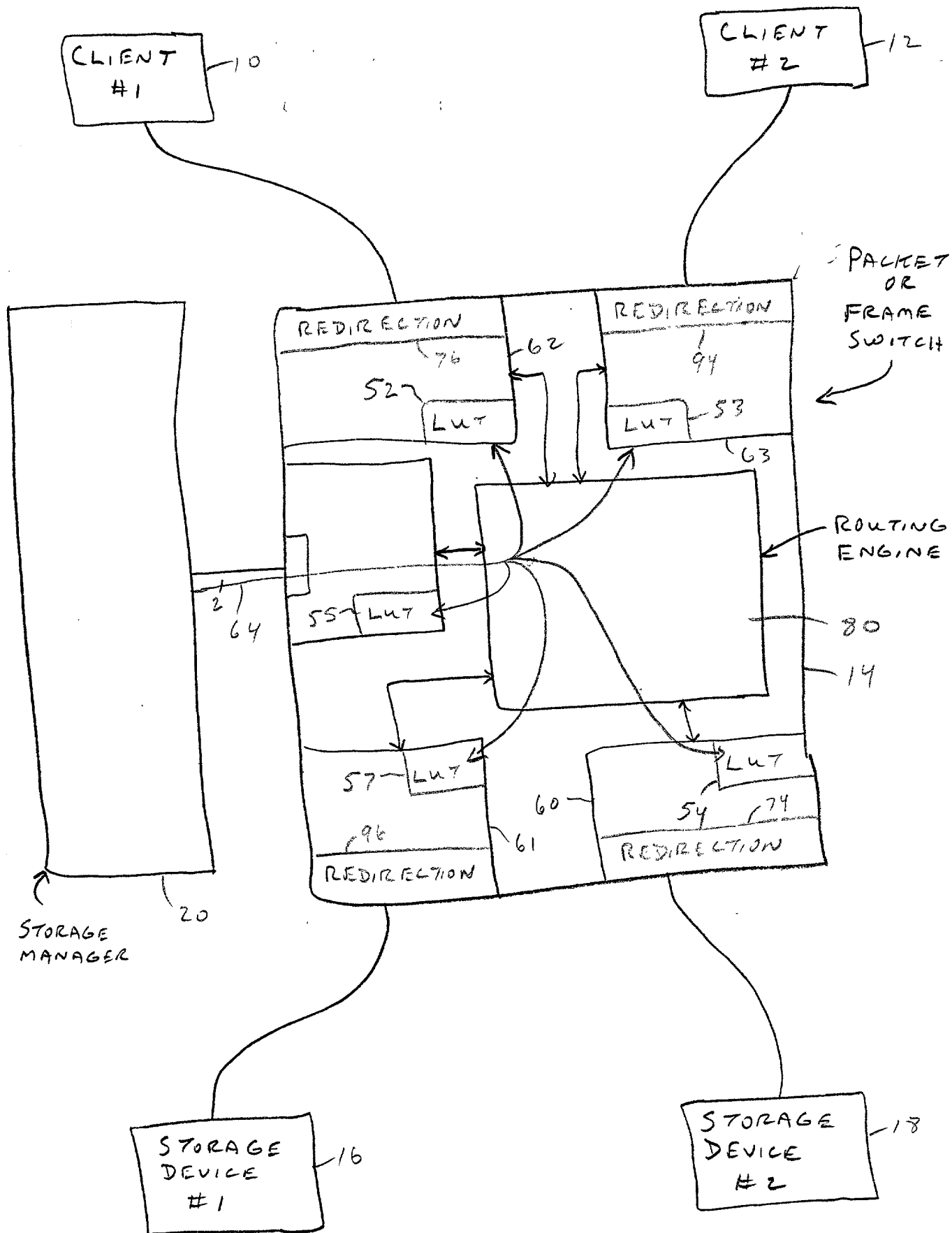


FIG. 6

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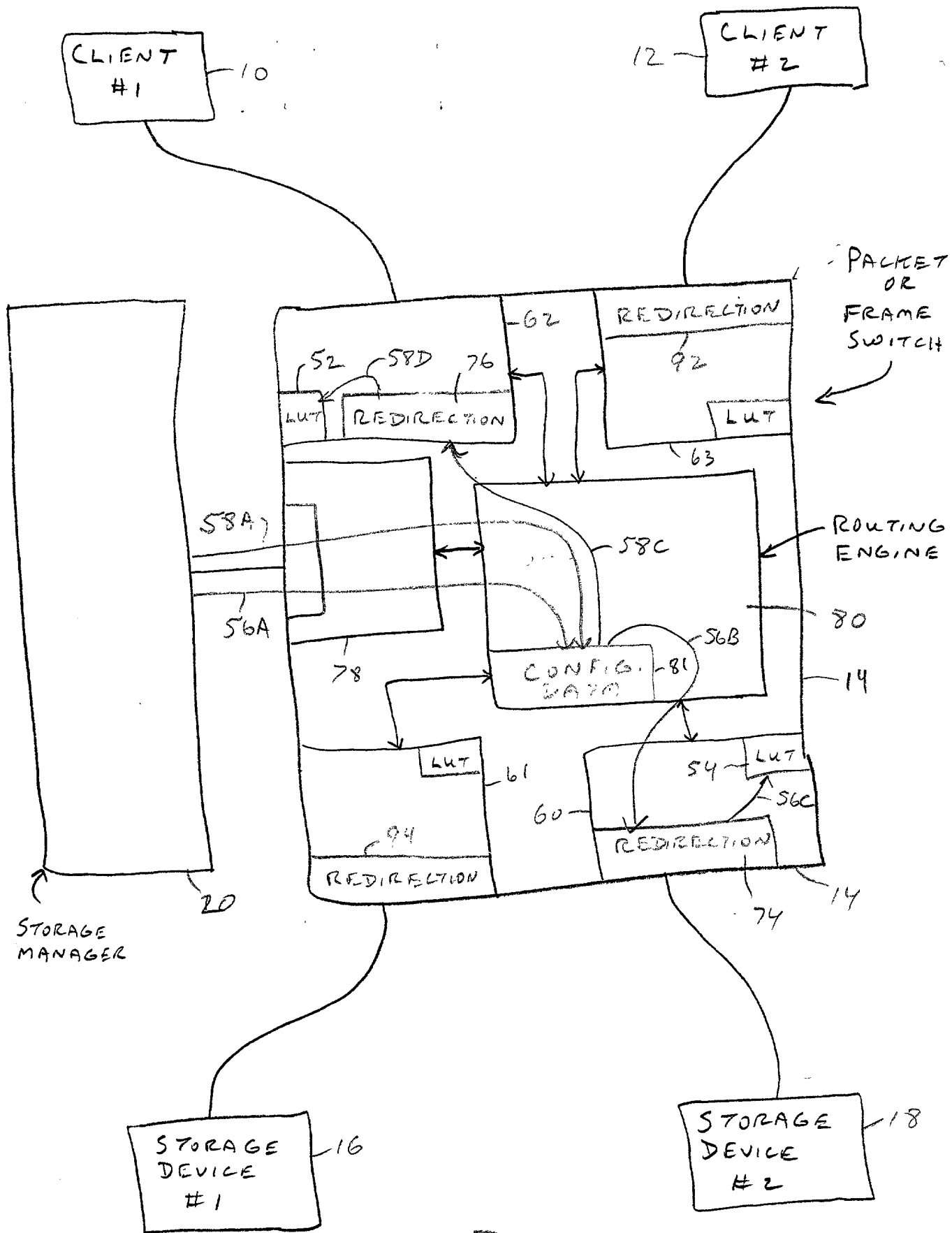


FIG. 7

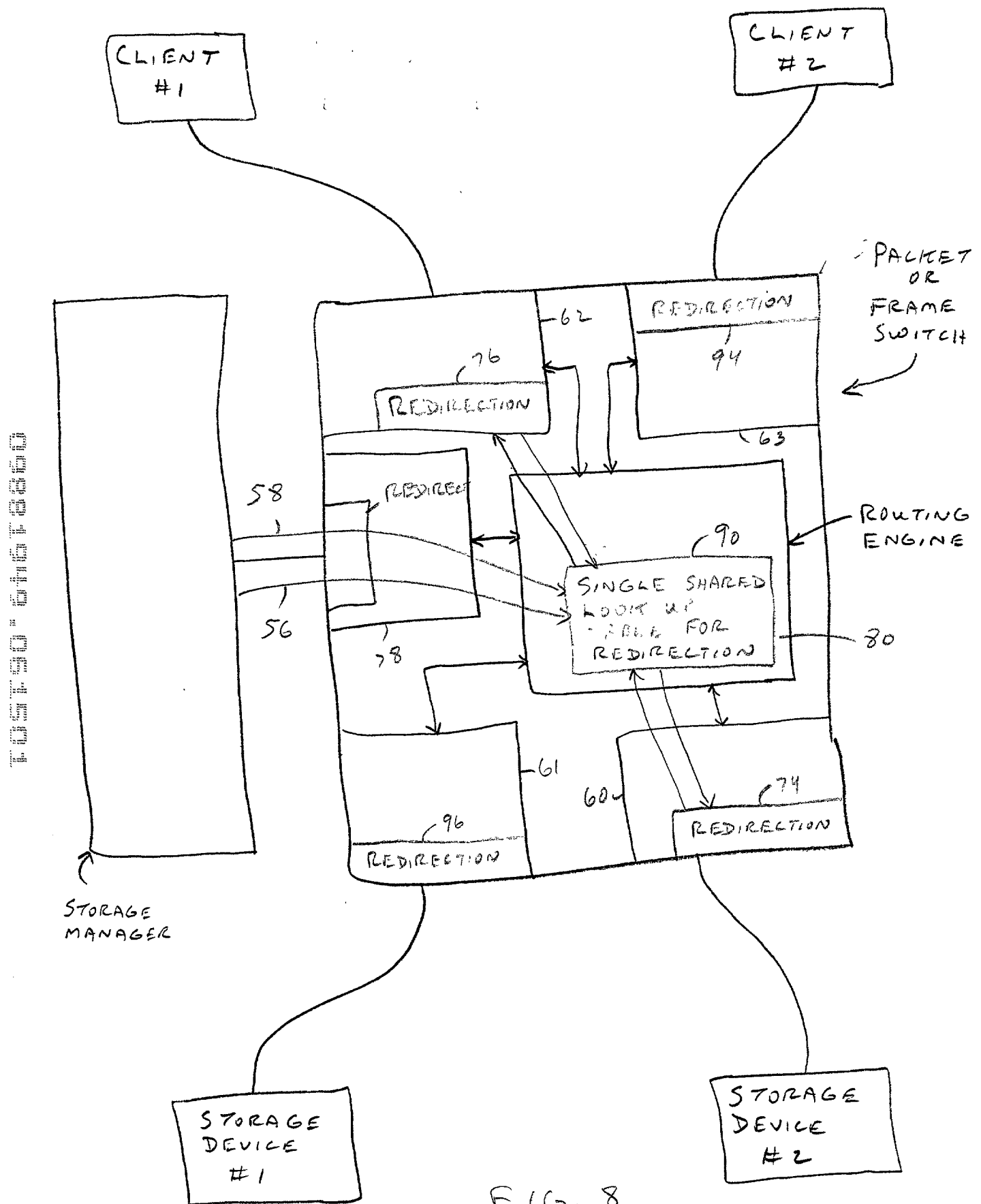


FIG. 9

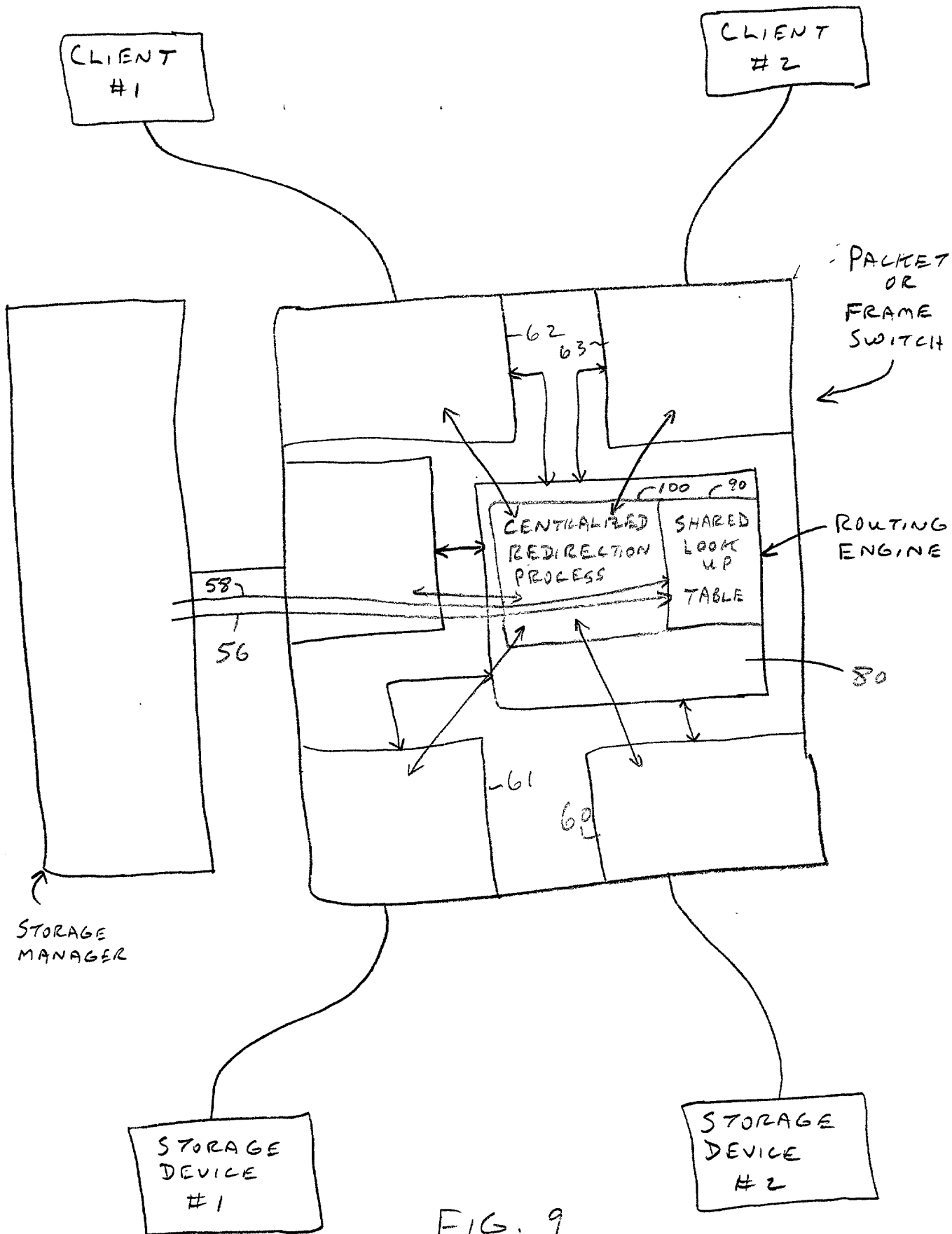


FIG. 9

ONE EMBODIMENT OF STORAGE MANAGER PROCESSING

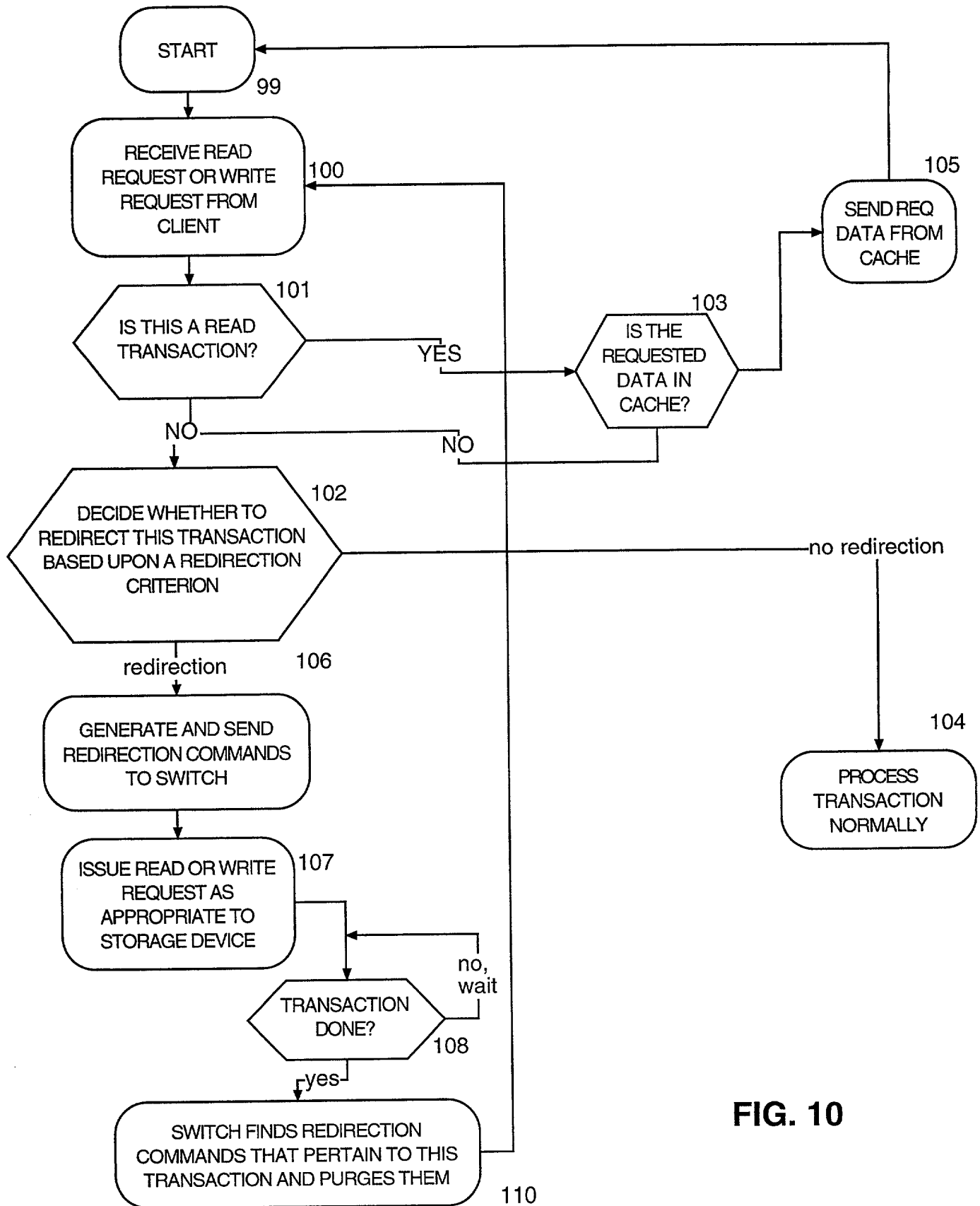


FIG. 10

REDIRECTION PROCESS IN SWITCH

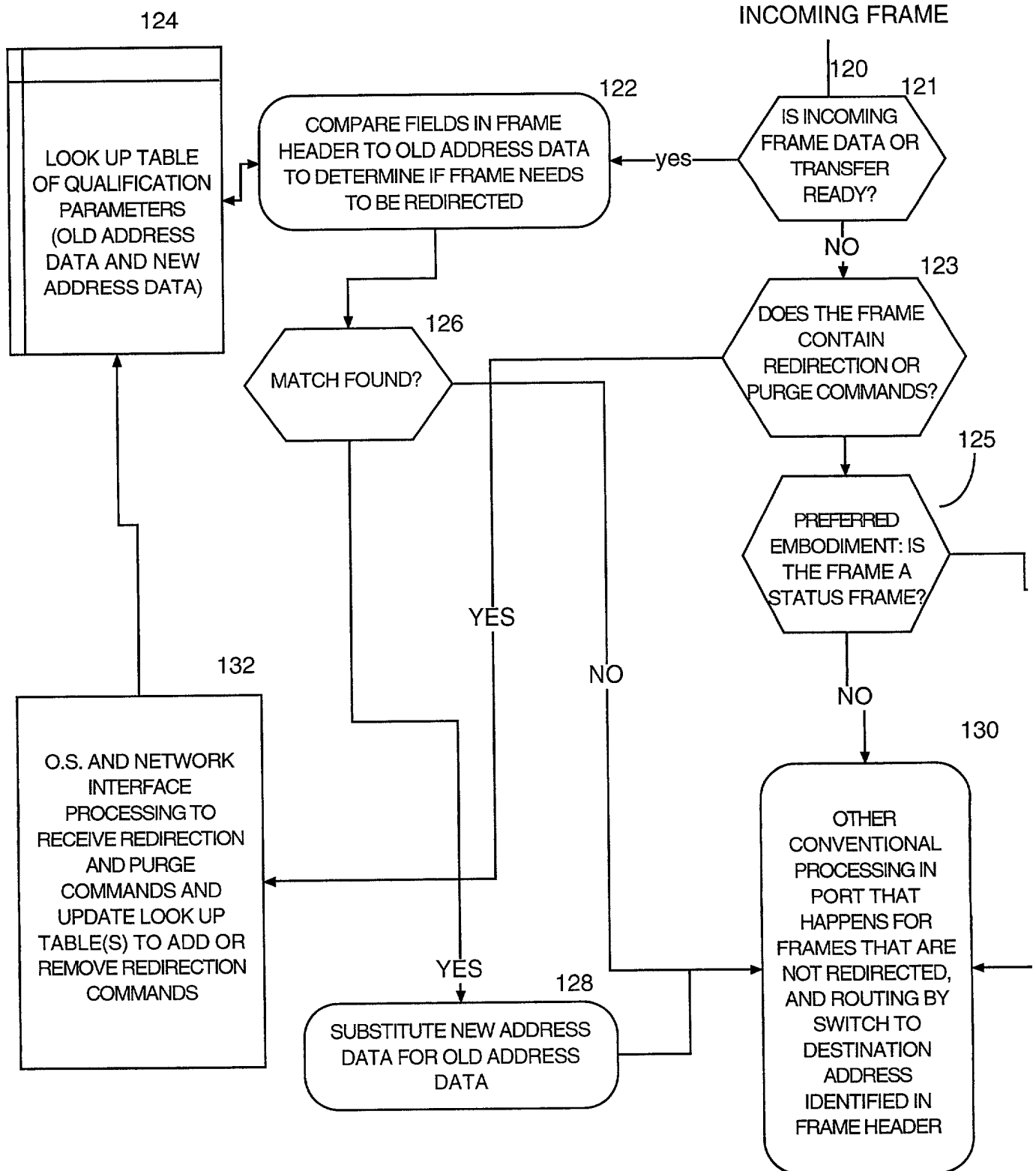


FIG. 11A

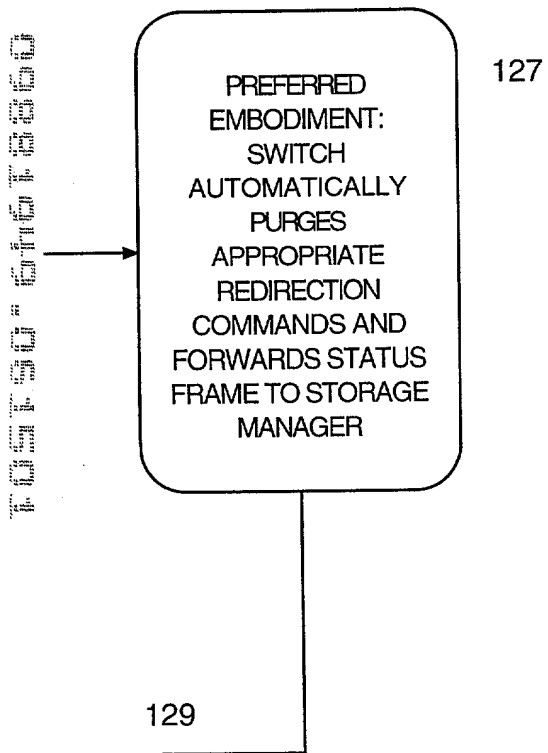


FIG 11B

FIG. 12

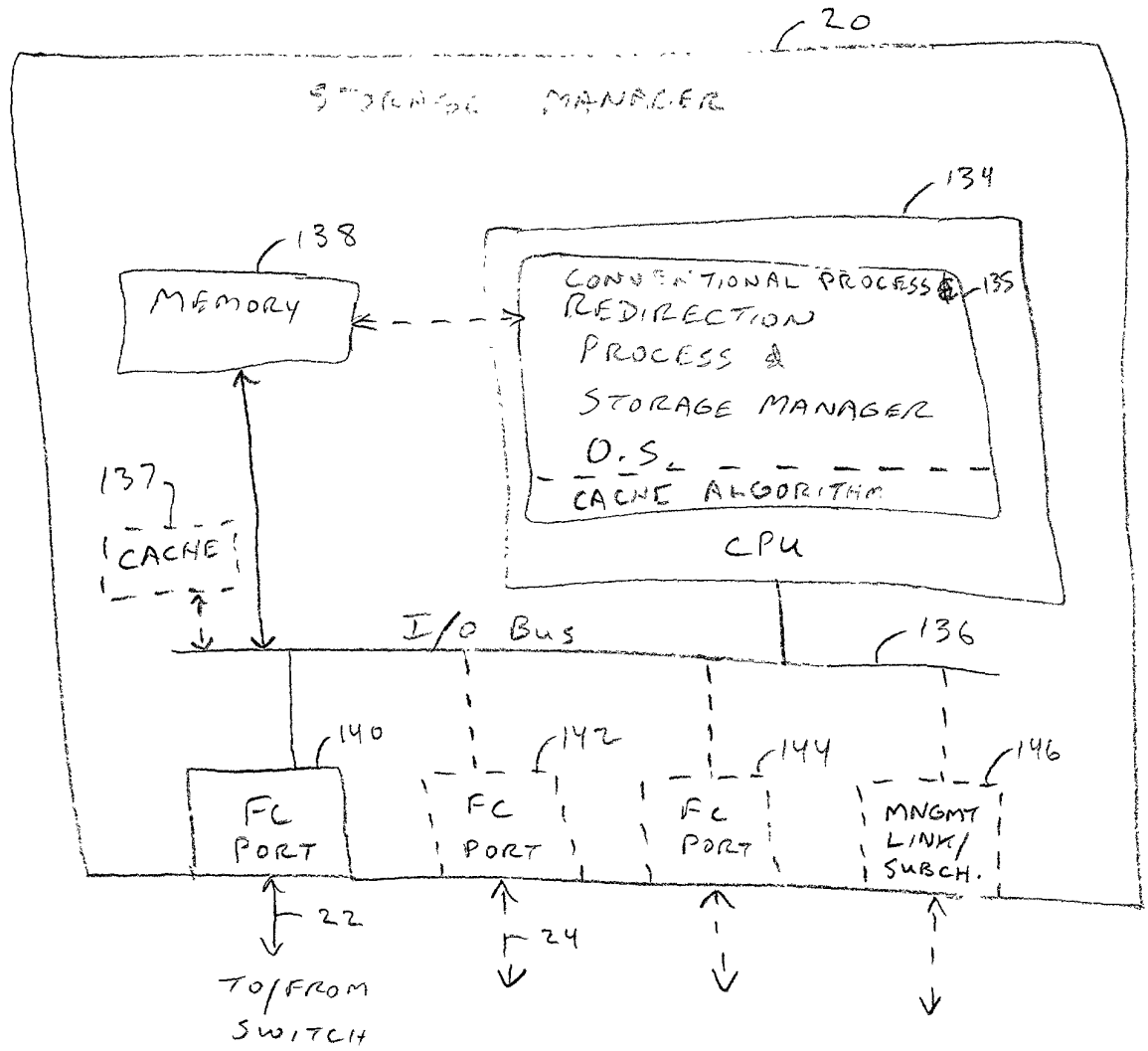


FIG. 12

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